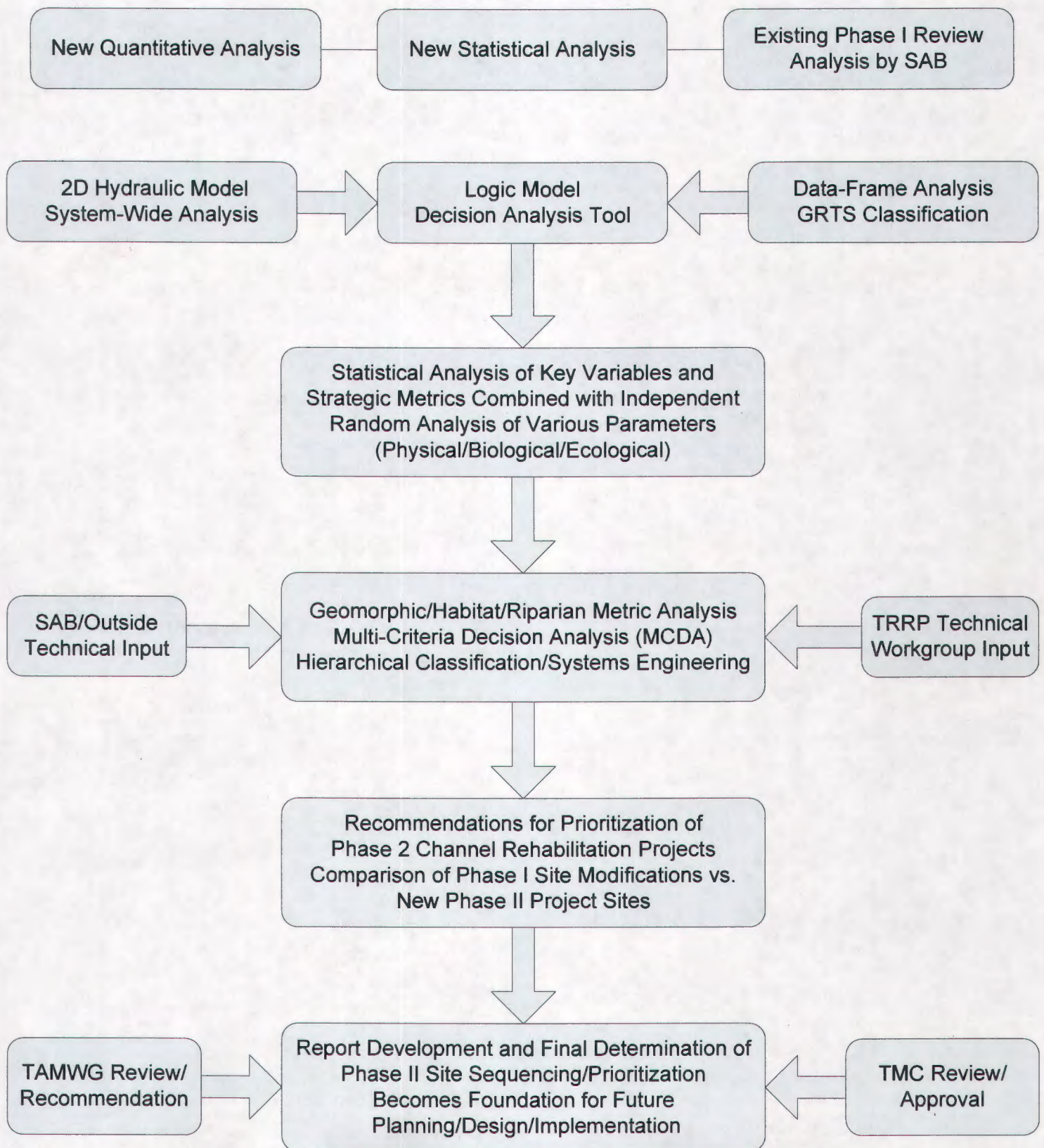


## TRRP Phase II Strategic Planning Process Multi-Criteria Decision Analysis (MCDA) Prioritization







## **Trinity River Restoration Program (TRRP) – Phase II Implementation Planning & Analysis**

**Background:** The TRRP has been implementing Channel Rehabilitation projects sites along the Trinity River's 40 mile restoration reach since 2005 under the authorization of the Record of Decision signed by Secretary of Interior in December 2000. The first phase of projects (Phase I) were implemented between 2005 and 2010 (Hocker Flat – 2005 and Lowden Ranch/Trinity House Gulch/Reading Creek – 2010). The Second Phase of implementation activities began in 2011 (Phase II) with the construction of the Wheel Gulch project. There are approximately five projects defined by specific Environmental Site Limits (ESL's) that has now been completed in Phase II with approximately 17 ESL's still remaining. A robust scientific review of the TRRP's Phase I Channel Rehabilitation projects was conducted during 2012/13 and draft results are still pending. More detailed background information can be found in the "Phase I Review" draft documents/analyses - provided upon request.

**Purpose/Goal/Objective:** To develop a comprehensive Phase II Implementation Plan that would guide the design and construction sequencing priorities of the remaining Phase II project sites or give rationale on if the program should go back to existing project sites for re-design. The plan would use a quantitative approach to combine detailed 2D hydraulic modeling, biological factors, and a comprehensive logic model to evaluate temporal and spatial sequencing of remaining projects. The final product will be a report that would detail approach/methodology, analyses, and give detailed recommendations for sequencing future project sites.

**Scope:** The analytical approach of the project will be the following:

- 1) Build 2D hydraulic model of the 40 Mile Trinity River Reach
- 2) Evaluate various key flows through the model (physical, biological, and ecological)
- 3) Evaluate key metrics for geomorphic process, rearing habitat (HSC), and riparian function at index flows using 2D system wide hydraulic model.
- 4) Build accompanying logic model with the following attributes:
  - Projects in relation to other biological factors including: adult holding/spawning
  - Ownership (public vs. private)
  - Height Above River Factors - Topography Constraints/Opportunities
  - Projects Spatial Relation to each other
  - Projects Cost/Benefit Ratio (Biological/Geomorphic Potential vs. How much level of effort to construct the habitat – Volume of Earth to remove tailings – relate to cost)
  - Other Factors
- 5) Evaluate hydraulic model results with logic model and robust statistical analysis to determine the optimal project sequencing and priority for future implementation.

### **Timeline/Deliverables:**

- Develop project approach and analysis plan – November/December 2013
- 2D Hydraulic Model Development –November / December 2013
- Logic Model Development –December/January 2013/2014
- Initial Internal /External Review – January/February 2014
- Analysis and Report Recommendations – January/February 2014
- Report Review and Editing (Internal/External) – March/April 2014
- Final Recommendations by SAB & TAMWG / Approval by TMC – April/May 2014





## Phase II Strategic Planning and Analysis

- Model Flows: 300, 450, 1000, 2000, 4500, 6000, 8500, 11000 CFS
- Note: All Variables Calculated for Each Modeled Flows per 200meter GRTS Panel

### General Channel Geometry/Hydraulic Variables:

- 1) Mean X-sectional Area
- 2) Mean Wetted Width
- 3) Mean Hydraulic Radius
- 4) Total Plan-form Wetted Area
- 5) Mean Depth
- 6) Mean Velocity Magnitude
- 7) Sinuosity
- 8) Mean Velocity % Directional Variance
- 9) Mean Height Above Water Surface (HAWS) Left/Right Bank @ 300ft Off River Centerline

### Key Physical/Geomorphic Metrics:

- 1) Mean/Divergent Sheer Stress
- 2) Unit Stream Power

### Key Biological/Habitat Metrics:

- 1) Pre-Smolt Rearing Habitat ( $m^2$ -days); Depth & Velocity HSC
- 2) Fry Rearing Habitat ( $m^2$ -days); Depth & Velocity HSC

### Key Ecological/Riparian Metrics:

- 1) Total Area that is 1ft to 4ft above the 450 cfs base flow
- 2) Total Area that is 1ft to 4ft. Above 4500 cfs index flow

### Existing Data-Frame Variables:

- 1) Spawning (REDDs)
- 2) Bedrock
- 3) Large Wood (Cover)
- 4) Mapped Habitat
- 5) Distance from Dam
- 6) River Mile
- 7) Riparian Berm Location
- 8) Carcass data

### Other Potential Data or Variables

- 1) Land Ownership
- 2) Distance to Pools Greater than 8Ft Depth (Holding)
- 3) USGS Geomorphic Mapping
- 4) Other

### Final Relationship for Prioritization

Environmental Site Limit - ESL (Project Boundaries)



## Phase II Strategic Planning/Analysis

2012/13 Digital Terrain Model (DTM)  
LiDAR Terrestrial Topography  
Sonar Based Bathymetry

Modeled Flows: 300, 450, 1000,  
2000, 4500, 6000, 8500, 11000 CFS

2D-Hydraulic Model - System Wide  
(SRH2D - BOR Technical Service Center)

2012/13 GPS-RTK Water Surface  
Profiles for Calibration/Validation

Data-Frame GRTS Panel System -  
200 Meter Contiguous Framework

Channel Geometry/Hydraulic Variables Calculated from Each Modeled Flows per 200meter GRTS Panel:  
1) Mean X-sectional Area; 2) Mean Wetted Width; 3) Mean Hydraulic Radius; 4) Total Planform Wetted Area; 5) Mean Depth; 6) Mean Velocity Magnitude; 7) Sinuosity; 8) Mean Velocity % Directional Variance; 9) Mean Height Above Water Surface (HAWS) Left/Right Bank @ 300ft Off River Centerline

### Key Physical/Geomorphic Metrics:

- 1) Mean/Divergent Sheer Stress;
- 2) Unit Stream Power

### Key Biological/Habitat Metrics:

- 1) Pre-Smolt Rearing Habitat ( $m^2$ -days); Depth & Velocity
- 2) Fry Rearing Habitat ( $m^2$ -days); Depth & Velocity

### Key Ecological/Riparian Metrics:

- 1) Total Area that is 1ft to 4ft above the 450 cfs base flow
- 2) Total Area that is 1ft to 4ft. Above 4500 cfs index flow

### Data-Frame Parameters:

- 1) Spawning (REDDs); 2) Bedrock; 3) Large Wood (Cover); 4) Mapped Habitat; 5) Distance from Dam; etc.

### Logic Model

#### Statistical Analysis Comparing/Evaluating Key Relationships:

- Channel Geometry Hydraulic Variables
- Geomorphic/Habitat/Riparian Metrics
- DataFrame and Other Key Data Sets

### Other Potential Data Sets:

- 1) Land Ownership; 2) Distance to Pools Greater than 8Ft Depth (Holding); 3) USGS Geomorphic Mapping; 4) Other

### Environmental Site Limits (ESL)

Remaining Phase 2 Channel  
Rehabilitation Project Sites

### Analysis Results

- 1) Strategic Comparisons of Key Metrics/Relationships
- 2) Unbiased Random Statistical Sampling/Comparisons
- 3) Link to Geographic Locations of Channel Rehabilitation Project Sites

### Environmental Site Limits (ESL)

Completed Phase 1 or Phase 2  
Channel Rehabilitation Project Sites

Prioritized Channel Rehabilitation Project Sites based  
On Quantitative Analysis

